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(71) Applicant and

(72) Inventor: ÁLVES, Hélio, Vieira [BR/BR]; Rua Duque de
Caxias nº86, CEP-04748-020 São Paulo, SP (BR).

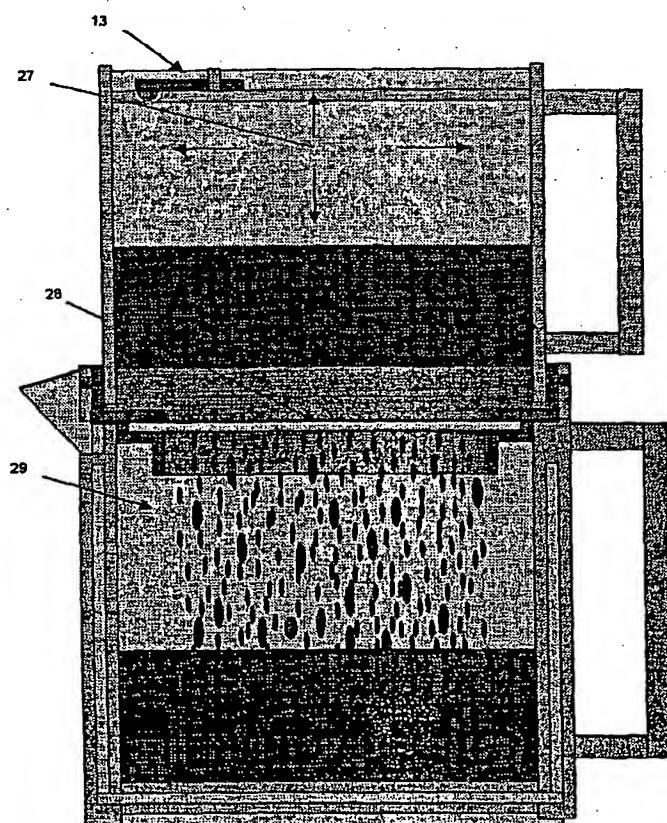
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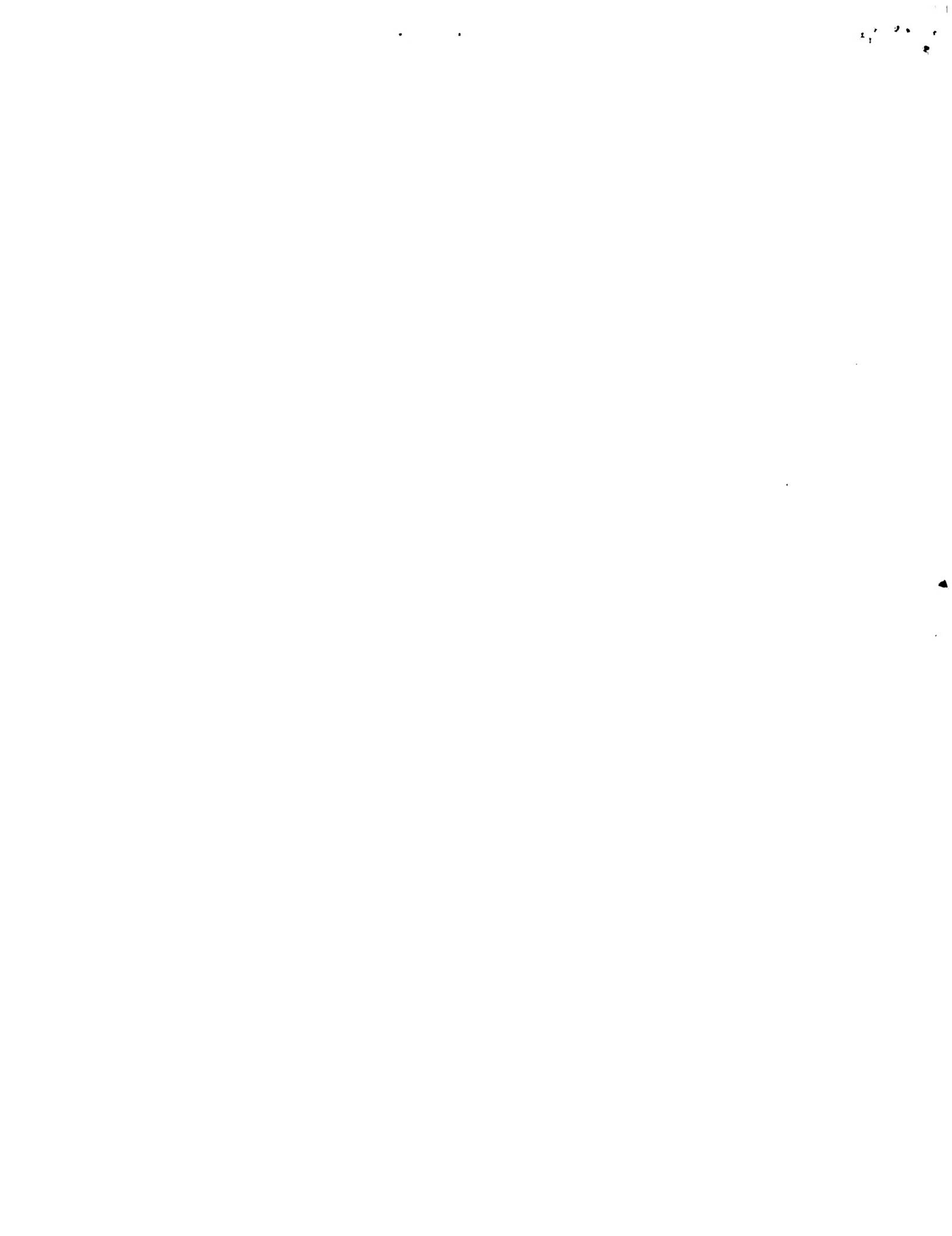
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(54) Title: MICROWAVE MULTIBOILING APPLIANCE



(57) Abstract: The present invention reveals a microwave multiboiling appliance. It does not use paper or fabric strainer. It makes coffee in microwave oven with water mixed to express coffee powder, which is filtered when boiling, under pressure, through a filtering metallic sieve, the coffee failing ready from the boiling receptacle directly to other receptacle of the appliance, proper also to serve on the table, which cause the coffee to reach an excellent and unequalled taste point, since it was boiled through fiction of water and coffee molecules (microwave oven process), which refines its maximum taste, it being filtered or strained in a total average time of about 2 minutes. Likewise, it also makes tea, with loose herbs, leaves or sachets. Both pure milk and chocolate can be boiled likewise. Soluble products are made by boiling the desired quantity of water or milk, which are poured under pressure through filter to the soluble powder (which then dissolves) and that is in the other receptacle, proper to serve on the table as well.



MICROWAVE MULTIBOILING APPLIANCE (FIGURE 7 – Cross Section – 1:1 Scale)

The present invention comprises a microwave (oven)-driven multiboiler appliance, serving to make express coffee with common coffee powder or soluble powder, as well as tea with herbs or loose leaves or in sachets, to make chocolate or to boil milk, or further to boil water, under pressure, in a prestipulated time, without needing paper or fabric strainer, the same appliance being further useful to serve other receptacles or to serve directly on the table, with an original conception, in view of its efficient use.

The invention is a novelty, and no domestic or foreign similar product is known to use in a microwave oven, as conceived.

As it is known, coffee powder usually is mixed to water and brought to a boil under fire action to be passed into a fabric or paper strainer (called non-woven fabric) and, in reaching the boiling point, the liquid enters in ebullition and grows in its volume, thereby forming gaseous bubbles which rise inside the receptacle, which then is removed from fire to prevent spillage, and then the liquid is filtered or strained in a fabric or paper strainer, thereby resulting in drinking coffee.

Another way to make coffee is boiling separately water and then pour it in the paper filter where coffee powder has been previously placed. Thus, hot water passes through coffee powder extracting its properties while it is strained by the filter in order to separate the powder, the coffee falling ready to serve into a suitable storage receptacle, the existence of a similar one that makes coffee in the same manner in microwave oven being known.

The present invention does not use a paper or fabric strainer. It makes coffee in microwave oven by bringing to a boil water mixed with express coffee powder, which is filtered while in ebullition, under pressure, through a metallic filtering sieve, the ready coffee being released directly in a receptacle which is also proper to serve on

the table, thereby resulting in a coffee with an excellent and unequalled taste, since it is boiled through the friction of water and coffee molecules (a microwave oven process), which refines its maximum taste, it being filtered or strained in a total average time of 2 minutes, which can vary 5 according to water volume, quantity of coffee powder used and intensity of microwave "temperature" in the oven used.

Likewise, it also makes tea, with loose herbs, leaves or sachets, refining most herb properties used, since it is boiled by friction of its molecules under action of oven microwaves and further under vapor pressure. 10

Both pure milk and chocolate can be boiled likewise. Soluble products are made by boiling the desired quantity of water, which is poured under pressure through filter to powder, which then mixes to water and which is in the other receptacle, also proper to serve.

15 **I – DESCRIPTON OF MATERIALS USED AND PARTS.**

MATERIALS: In order to make parts to be described below, microwave oven-resistant materials and proper to foods will be used, a filtering sieve to be made in stainless steel and inner walls of the receptacle to serve will be made in aluminum and plastic-coated; in all 20 pieces, imported plastic (Polieter Imida PEI) will be used, which is unbreakable, transparent, resistant to high temperatures and meets FDA standards in USA, and said plastic can also be substituted, only in the common cover, for another plastic produced in Brazil called Polypropylene Randon Polymer – RP-141 or other ones produced either 25 in Brazil or overseas, having at least the same technical specifications thereof.

PARTS (numbered as FIGURES, in 1:1 SCALE):

BOILING RECEPTACLE – (FIGURE 1 – Cross Section and FIGURE 30 1.1 – top view): cylinder-shaped receptacle, containing either in its mouth or upper part (1) an outside thread, in order that the COVER WITH A FILTER – FIGURE 2 may be threaded thereto; it contains in its

bottom wall, a very small excavated hole (2) in the thickness of this wall, in the format of a half hollow sphere with larger diameter (0.5mm) turned outwards, intended to form a Safety Valve (13) together with the external part (4) which is a FIXED SUPPORT – FIGURE 1.2 (Cross section), Figure 1.3 (Longitudinal section) and FIGURE 1.4 (Top view), in a rectangular lug shape, where the PRESSURE SEALING PIECE – FIGURE 3 will be fitted; it further has a small base (3) which is ring-shaped or tapered (extension of lateral walls beyond the bottom), which serves as a base to the piece, when the latter has its mouth upwards); still in its outside part, it has a hollow lug (5) in horizontal extensions (6) which serves to grip this receptacle whatever position, whose utility is distinguished when it is very hot.

COVER WITH FILTER – (FIGURE 2 – Cross Section) containing a FILTER – FIGURE 2.1 (Cross Section) and FIGURE 2.2 (Top view): it is made by injection (8) at stainless steel filter edges, having circular format and smooth edge, containing small holes (11) with less than 1mm thick at the surface, and serve to filter the coffee powder, allowing the liquid to pass, however retaining powder, and likewise tea or similar particles; it contains an inner thread (9) to fasten threaded (12) to the mouth of COMPLETE BOILING RECEPTACLE – FIGURE 4; it will be made in 3 dimensions with small holes (11) according to its destination: for coffee, soluble products, water or tea; and for milk or chocolate; externally, near threaded mouth, it has two pins (10) which will be fitted into the RECEPTACLE FOR STRAINED ITEMS AND/OR TO SERVE ON THE TABLE – FIGURE 5.

PRESSURE SEAL – (FIGURE 3 – Cross Section and FIGURE 3.1 – Top view); a rectangular format plastic piece, having in one of its ends and at the width part, the added form of a convex half sphere which will fit into the concavity (2) existing at the bottom of the BOILING RECEPTACLE – FIGURE 1 for sealing (13), it being fastened to the lug (14) of the outside bottom of the COMPLETE BOILING RECEPTACLE

– FIGURE 4, thereby forming a SAFETY VALVE (13) of this receptacle.

BASIC BOILING RECEPTACLE – (FIGURE 4, Cross section): formed by the set of parts of the BOILING RECEPTACLE – FIGURE 1 of the COVER WITH FILTER – FIGURE 2 threaded thereto (12) and by 5 the SAFETY VALVE (13) formed with the fitting to the receptacle (14) of the PRESSURE SEAL – FIGURE 3. This BASIC BOILING RECEPTACLE, in itself constitutes a Multiboiling Appliance representing the concept or spirit of the invention and can operate individually, by following certain technical cautions, if coupled to other 10 receiving bases of liquids, such as a common aluminum bowl, for example.

RECEPTACLE FOR STRAINED ITEMS AND/OR TO SERVE – (FIGURE 5 – Cross section and FIGURE 5.1 – Top view): cylindrical receptacle, having throughout dimension of its lateral walls and bottom, 15 plastic-covered and bowl-shaped aluminum piece (18) forming the receptacle, intended to prevent direct action of microwaves in the liquid inside it; it has an upper opening of a larger diameter (15) above the liquid flowing nozzle (17) which serves to form an internal protrusion (15) where the cover of BASIC BOILING RECEPTACLE of FIGURE 4 20 will be supported and fitted, turned 180° (upside down), which also will be fastened through fitting of cover pins (10) into the fit openings (16) existing at upper walls of the mouth of this receptacle, which also has a lug in rectangular wing format to be gripped by the mouth (19), this lug 25 containing openings (20) at upper and bottom horizontal parts which connect it with the receptacle;

COMMON COVER – (FIGURE 6 – Cross Section and FIGURE 6.1 – Top view): made in plastic, with a cylindrical format, it contains in its upper part two parallel lowerings (22) to hold it through finger fitting, and a cylinder-shaped lateral wall (21) containing a rectangular hollow 30 (23) intended both to fit into the mouth of the RECEPTACLE FOR STRAINED ITEMS AND/OR TO SERVE – FIGURE 5 and over the

bottom (24) of the BOILING RECEPTACLE – FIGURE 1, when it is in reverse position, at 180° (upside down), forming the MICROWAVE MULTIBOILING APPLIANCE of FIGURE 7.

MICROWAVE MULTIBOILING APPLIANCE – (FIGURE 7 –

5 Cross Section; formed by the mounted and coupled assembly of above-described parts, namely: BOILING RECEPTACLE – FIGURE 1; COVER WITH FILTER – FIGURE 2; PRESSURE SEAL – FIGURE 3; RECEPTACLE FOR STRAINED ITEMS AND OR TO SERVE – FIGURE 5, intended, in this position, with or without upper cover, to

10 work as a multiboiler of liquids such as water, tea, coffee, milk, chocolate, etc.

II – DEMONSTRATION OF THE INVENTION OPERATION:
BOILING RECEPTACLE – POSITION OF PREPARATION - FIGURE
8 – BASIC BOILING RECEPTACLE – POSITION OF PREPARATION
15 **– FIGURE 9 – MICROWAVE MULTIBOILING APPLIANCE IN**
OPERATION – POSITION OF PREPARATION FIGURE 10:
MICROWAVE MULTIBOILING APPLIANCE IN OPERATION –
POSITION OF BOILING – FIGURE 11; RECEPTACLE FOR
STRAINED ITEMS AND/OR TO SERVE WITH LIQUID – FIGURE 12.

20 The following describes the operation of multiboiling appliance for straining or making express coffee, with standard express coffee powder, whose most procedures are common in its general use.

One takes the BOILING RECEPTACLE - POSITION OF PREPARATION – FIGURE 8 with the SAFETY VALVE assembled and

25 in normal position, with the mouth upwards, and place in it (25) water and coffee powder according to recommended measures. Then, it is placed externally, threading the COVER WITH FILTER around its mouth (26), thereby forming the BASIC BOILING RECEPTACLE –

FIGURE 9 which is in position of temperature preparation.

30 Then, one takes the RECEPTACLE FOR STRAINED ITEMS AND/OR TO SERVE of FIGURE 5, by turning it 180°, upside down,

makes the fitting of its mouth into the external pins of the cover of the BASIC BOILING RECEPTACLE, thereby forming the MICROWAVE MULTIBOILING APPLIANCE IN OPERATION – POSITION OF PREPARATION – FIGURE 10, which in this position, *for temperature preparation to extraction under pressure*, it should be taken to the inner center of the Microwave Oven and after closing the oven cover, the maximum temperature should be driven for 1 minute (full at half volume of the receptacle) or up to 2 minutes (full at total volume of the receptacle), the quantity of liquid in the receptacle depending on the 5 temperature preparation which, in being higher, will need additional time, contrary to the quantity of powder used that, in being higher, it will need less time for elevation to the same temperature as desired. Such a 10 temperature preparation of the liquid aims to raise it from 55°C to 75°C approximately, which occurs both in this time or in another, according to 15 the oven used and specific instructions given.

After the preparation time, the MICROWAVE MULTIBOILING APPLIANCE is removed from the oven and should be rotated 180°, thereby inverting its position, the RECEPTACLE FOR STRAINED ITEMS AND/OR TO SERVE of FIGURE 5 remaining in the lower part, 20 and in the upper part, inverted at 180°, the BASIC BOILING RECEPTACLE of FIGURE 4, thereby forming the MICROWAVE MULTIBOILING APPLIANCE IN OPERATION in BOILING POSITION of FIGURE 11, which will be taken once more to the center of the microwave oven, and at no time the appliance should be placed in a 25 proximity near to or lower than 3 cm of oven laterals, that is, out of the rotary dish, or further, together with another metallic piece, since it could cause sparkling and damage the oven.

After 1 minute and 30 seconds (or in accordance with instructions for the specific oven), at the maximum temperature, the liquid composed of water and coffee will start its boiling inside the BASIC 30 BOILING RECEPTACLE which, in accumulating internal pressure with

the vapor (27) will expel the liquid of boiling coffee outwards, which will be done by the only outlet, through very small holes (28) existing in the stainless steel filter, which will allow only the release of liquid added from coffee properties, retaining the powder. The liquid coffee will pass 5 through the filter (28) and will fall ready (20) into the RECEPTACLE FOR STRAINED ITEMS AND/OR TO SERVE – FIGURE 11.

As soon as the entire coffee is filtered, within the prestablished time, either the appliance should be removed from the microwave oven and taken directly to the table, or otherwise, preferably over the kitchen 10 sink, the RECEPTACLE FOR STRAINED ITEMS AND/OR TO SERVE WITH COVER – FIGURE 12 will be disconnected from it, which is covered in order to serve the ready coffee, leaving in the sink the piece of BASIC BOILING RECEPTACLE removed, where it will be washed after removing powder accumulated with filter, directly to the trash.

15 Coffee so obtained will be highly pure and sterilized, since only noble materials have been used in the MULTIBOILING APPLIANCE, proper to be used in foods, which do not suffer any degradation action when submitted to oven microwaves.

20 Taste of coffee, tea or chocolate will be highly refined due to the use of microwaves in the boiling only, and due to the non-use of fabrics or paper at the filtering process, thereby producing a coffee with an excellent and unequalled point of taste, since it was also boiled under pressure only together water.

25 The appliance operates without any liquid spillage inside the microwave oven, and this is the reason why the RECEPTACLE FOR STRAINED ITEMS AND/OR TO SERVE, as it contains aluminum internal walls, seals the action of microwaves inside it, while filtering and receiving of liquid in it is expelled through the filter, thereby preventing liquid from reboiling inside it during such a filtering.

30 In the very remote rare case of filter clogging, inner pressure of the receptacle (27) will increase to the point of activating the existing

safety valve (13) existing, allowing the decompressing through vapor release through this valve. Should in another even more remote case, the safety valve (13) do not work, the inner pressure will cause, through the force it will exercise, the direct disconnection at the threading place 5 of the COVER WITH FILTER of FIGURE 2 of the BOILING RECEPTACLE of FIGURE 1, which will cause liquid spillage inside the microwave oven only, and so, the total safety of the present invention is demonstrated.

On the other hand, in order to use the same appliance to make 10 tea, both with loose herbs, leaves or even in sachets, one should follow the same procedures as to make coffee, changing only the coffee powder into tea and at the time of *temperature preparation for extraction under pressure*, time used to coffee should be duplicated, since tea demands a longer time for extraction of its properties. As to the inverse 15 position to boil and strain, the appliance placed again inside the microwave will take at most 1 minute to filter the boiling tea to receptacle for serving.

As to pure milk, it takes on average the same time of *temperature preparation for extraction under pressure* as used to coffee; and in order 20 to boil and strain, it will take at most 1 minute to pass entirely to the receptacle to serve, the same happening by adding either chocolate or cocoa to milk either before or after the temperature preparation.

In order to make soluble coffee, one should take into consideration that the best procedure is pouring boiling water over 25 powder.

For such a purpose, the COMPLETE BOILING RECEPTACLE should be full with filtered water and taken directly to microwave woven for temperature preparation for extraction under pressure and there leave it at the same time as mentioned for preparation of express 30 coffee, while the quantity of soluble coffee suitable to the volume of water placed in the other receptacle is placed in the RECEPTACLE OF

STRAINED ITEMNS AND/OR TO SERVE. After such a preparation time, the COMPLETE BOILING RECEPTACLE is removed from the Microwave Oven and turning it upside down, that is, rotating it 180°, one fits it into the RECEPTACLE FOR STRAINED ITEMS AND/OR TO 5 SERVE, which will already contain the soluble powder over which boiled water will be poured, expelled from the boiling receptacle, at the maximum time of 1 minute.

A time table for heating with the temperature according to marks of the Microwave Oven and according to contents of the liquid 10 preparation to boil, will follow the appliance for user's guidances during the initial understanding on the use thereof.

As each user will use its appliance in the microwave oven it has, it will end up knowing rapidly the own temperature time table to use, which will not depend on the temperature standard adopted by the other 15 microwave oven manufacturers.

CLAIMS.**1°) MICROWAVE MULTIBOILING APPLIANCE – (FIGURE 7 –**

Cross Section – 1:1 Scale) characterized by a Final Element, composed of the following parts:

5 **a) BOILING RECEPTACLE – (FIGURE 1 – Cross Section and FIGURE 1.1 – top view):** cylinder-shaped receptacle, containing either in its mouth or upper part (1) an outside thread, in order that the COVER WITH A FILTER – FIGURE 2 may be threaded thereto; it contains in its bottom wall, a very small excavated hole (2) in the thickness of this wall, in the shape of a half hollow sphere with the larger diameter (0.5mm) turned outwards, intended to form a Safety Valve (13) together with the external part (4) which is a FIXED SUPPORT – FIGURE 1.2 (Cross section), Figure 1.3 (Longitudinal section) and FIGURE 1.4 (Top view), in a rectangular lug shape, where the PRESSURE

10 SEALING PIECE – FIGURE 3 will be fitted; it has further a small base (3) which is ring-shaped or tapered (extension of lateral walls beyond the bottom), which serves as base to the piece, when the latter has its mouth upwards), still in its outside part, it has a hollow lug (5) in horizontal extensions (6) which serves to grip this receptacle whatever

15 positions and whose utility is distinguished when it is very hot.

20 **b) COVER WITH FILTER – (FIGURE 2 – Cross Section) containing a FILTER – FIGURE 2.1 (Cross Section) and FIGURE 2.2 (Top view):** made by injection (8) at stainless steel filter edges (8), having circular format and smooth edge, containing small holes (11) at the surface of thickness lower than 1 mm, and serve to filter the coffee powder, allowing the liquid to pass, however retaining powder, and likewise tea or similar particles; it contains inner thread (9) to be hold threaded (12) to the mouth of COMPLETE BOILING RECEPTACLE – FIGURE 4; it will be made in 3 dimensions with small holes (11) according to its destination: for coffee, soluble products, water or tea; and for milk or chocolate; externally, near threaded mouth, it has two pins (10) which

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will be fitted into the RECEPTACLE FOR STRAINED ITEMS AND/OR TO SERVE ON THE TABLE – FIGURE 5.

5 c) PRESSURE SEAL – (FIGURE 3 – Cross Section and FIGURE 3.1 – Top view); a rectangular format plastic part, having in one of its ends and at the width part, the added form of a convex half sphere which will fit into concavity (2) existing at the bottom of the BOILING RECEPTACLE – FIGURE 1 for sealing (13), it being fastened to the lug (14) of the outside bottom of the COMPLETE BOILING RECEPTACLE – FIGURE 4, thereby forming a SAFETY VALVE 913) of 10 this receptacle.

15 d) BASIC BOILING RECEPTACLE – (FIGURE 4, Cross section): formed by the set of parts of the BOILING RECEPTACLE – FIGURE 1 of the COVER WITH FILTER – FIGURE 2 threaded thereto (12) and by the SAFETY VALVE (13) formed with the fitting to the receptacle (14) of the PRESSURE SEALING PIECE – FIGURE 3. This BASIC BOILING RECEPTACLE, in itself constitutes a basic multiboiling appliance constituting the nucleus of the invention which can operate individually, by following certain technical cautions, if coupled to other receiving bases of liquids, such as a common aluminum bowl, for 20 example.

25 e) RECEPTACLE FOR STRAINED ITEMS AND/OR TO SERVE – (FIGURE 5 – Cross section and FIGURE 5.1 – Top view): cylindrical receptacle, having throughout dimension of its lateral walls and bottom, a plastic-coated and bowl-shaped aluminum piece (18) forming the receptacle, intended to prevent direct action of microwaves in the liquid inside it; it has an upper opening of a larger diameter (15) above the liquid flowing nozzle (17) which serves to form an internal protrusion (15) where the cover of BASIC BOILING RECEPTACLE of FIGURE 4 will be supported and fitted, turned 180 (upside down), which also will 30 be fastened through fitting of cover pins (10) into the fit openings (16) existing at upper walls of the mouth of this receptacle, which also has a

lug in rectangular wing format to be gripped by the mouth (19), this lug containing openings (20) at upper and bottom horizontal parts which connect it with the receptacle;

5 **f) COMMON COVER – (FIGURE 6 – Cross Section and FIGURE 6.1 – Top view);** made in plastic, with a cylindrical format, contains in its upper part two parallel lowerings (22) to hold it through finger fitting, and a cylinder-shaped lateral wall (21) containing a rectangular hollow (23) intended both to fit into the mouth of the RECEPTACLE FOR STRAINED ITEMS AND OR TO SERVE – FIGURE 5 and in the bottom

10 (24) of the BOILING RECEPTACLE – FIGURE 1, when it is in reverse position, at 180° (upside down), forming the MICROWAVE MULTIBOILING APPLIANCE of FIGURE 7.

15 **2º) MICROWAVE MULTIBOILING APPLIANCE – (FIGURE 7 – Cross Section – 1:1 Scale) characterized for having 1 Basic Element, called BASIC BOILING RECEPTACLE – FIGURE 4 (Cross Section) which in itself constitutes a multiboiling basic appliance, the main object of the invention, and therefore can work individually, with the same final result as the main Microwave Multiboiling Appliance of Figure 7 – when the technical conception of the invention is followed in another way, for example, by taking to microwave oven on an aluminum bowl with nozzle.** On account of this, it should also be protected, individually, according to the present claim. It comprises 1 Final Element composed by the following parts coupled each other: BOILING RECEPTACLE – FIGURE 1 (Cross Section) and FIGURE 1.1 (Top view): cylindrical plastic receptacle, containing at the upper part of its mouth (1) outside thread, in order that the COVER WITH FILTER – FIGURE 2, may be threaded therein; it contains in its bottom wall, a very small excavated hole (2) in the thickness of this wall, in the shape of a half hollow sphere with the larger diameter (0.5mm) turned outwards, intended to form a

20 SAFETY VALVE (13) together with the external part (4) which is a FIXED SUPPORT – FIGURE 1.2 (Cross section), FIGURE 1.3

(Longitudinal section) and FIGURE 1.4 (Top view), in a rectangular lug shape, where the PRESSURE SEALING PIECE – FIGURE 3 will be fitted; it has further a small base (3) which is ring-shaped or tapered (extension of lateral walls beyond the bottom), which serves as base to 5 the piece, when the latter has its mouth upwards), still in its outside part, it has a hollow lug (5) in horizontal extensions (6) which serves to grip this receptacle whatever position and whose utility is distinguished when it is very hot.

3º) MICROWAVE MULTIBOILING APPLIANCE – (FIGURE 7 – 10 Cross Section – 1:1 Scale) according to claims 1 and 2, characterized in that the same appliance has multifunctional use conception, that is, the same appliance can perform cooking and/or boiling of varied liquid foods, such as water and milk, together with other solids and/or soluble products, such as coffee, tea or chocolate, through the action of oven 15 microwaves which, acting over them inside the appliance, obtains always the same result.

4º) MICROWAVE MULTIBOILING APPLIANCE – (FIGURE 7 – 20 Cross section – 1:1 Scale), according to claims 1 and 2, characterized in that it performs, through the action of microwaves inside the oven, cooking and/or boiling in water, milk, coffee, tea, chocolate, while with 25 pressure of vapor accumulated inside the receptacle, produces force sufficient to filter the liquid, extracting the properties of foods together and expel it directly from a BASIC BOILING RECEPTACLE – FIGURE 4 placed above, to another receptacle, below, thereby working as if it were an express coffee machine, however driven for microwave action.

5º) MICROWAVE MULTIBOILING APPLIANCE – (FIGURE 7 – 30 Cross section – 1:1 Scale), according to claim 1, characterized in that it is intended, in addition to obtain pure water or milk, or added to coffee, tea or chocolate, etc., boiled and ready to consume, can further be used to serve final liquids boiled directly on the table at the same complete appliance or only in the RECEPTACLE FOR STRAINED ITEMS

AND/OR TO SERVE WITH COVER of FIGURE 12.

6°) MICROWAVE MULTIBOILING APPLIANCE – (FIGURE 7 –

Cross section – 1:1 Scale), according to claims 1 and 2, characterized in that it has its BASIC BOILING RECEPTACLE – FIGURE 4 (Cross Section) a SAFETY VALVE (13) comprising the following parts: PRESSURE SEAL – FIGURE 3 (Cross section), which in turn is a rectangular loose plastic piece, having in one of its ends and in the width part, the added form of a convex half sphere which will fit exactly to seal (13) the hollow half sphere concavity (2) existing in the bottom of the other piece, the BOILING RECEPTACLE – FIGURE 1, and grip to the rectangular lug existing in this same receptacle bottom, in its external part, thereby forming the SAFETY VALVE (13).

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FIGURE 1

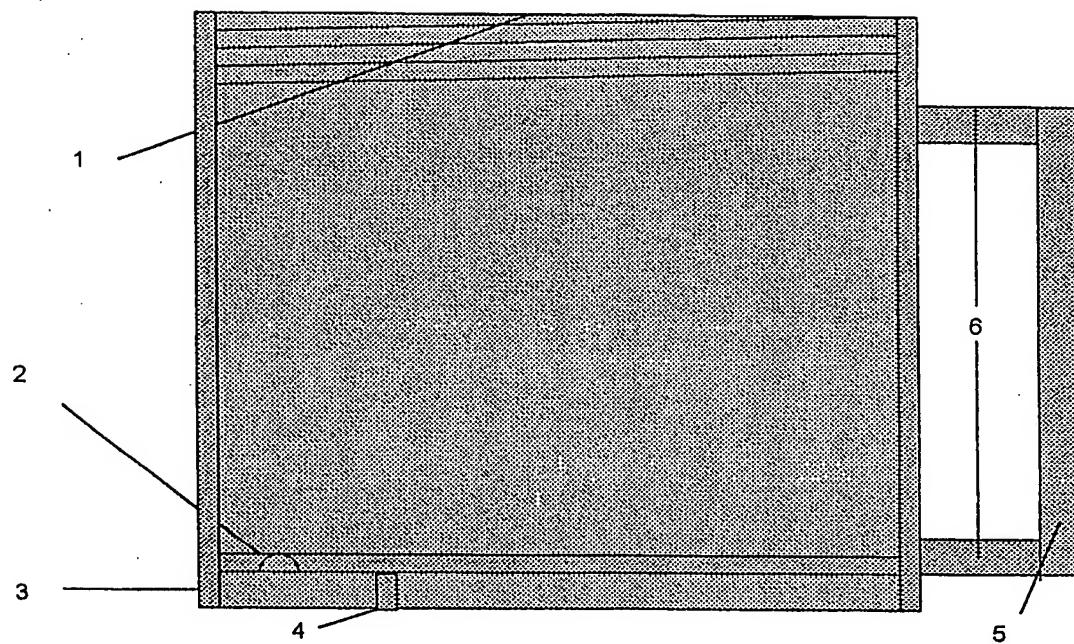


FIGURE 1.1

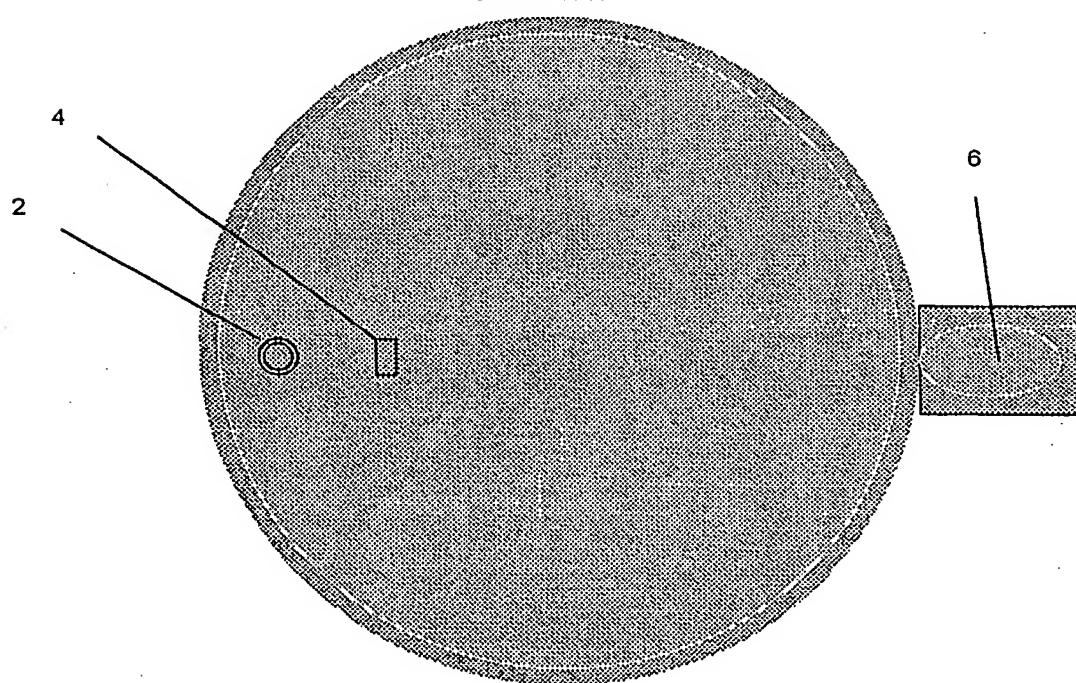


FIGURE 1.2.



FIGURE 1.3



FIGURE 1.4





FIGURE 2

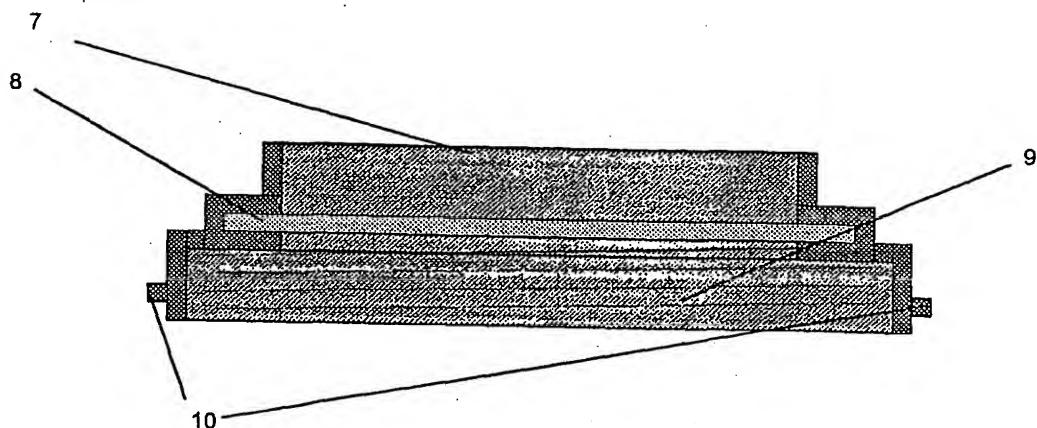
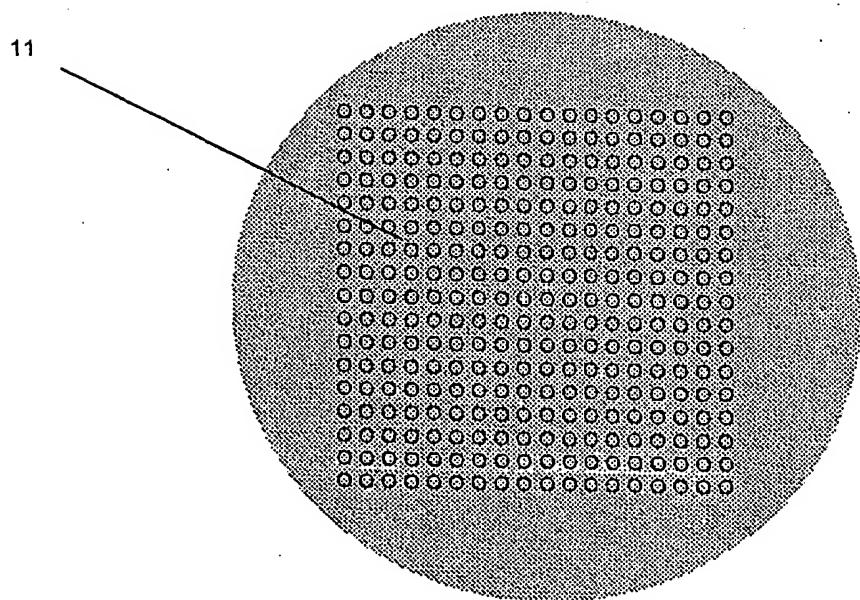


FIGURE 2.1.



FIGURE 2.2.





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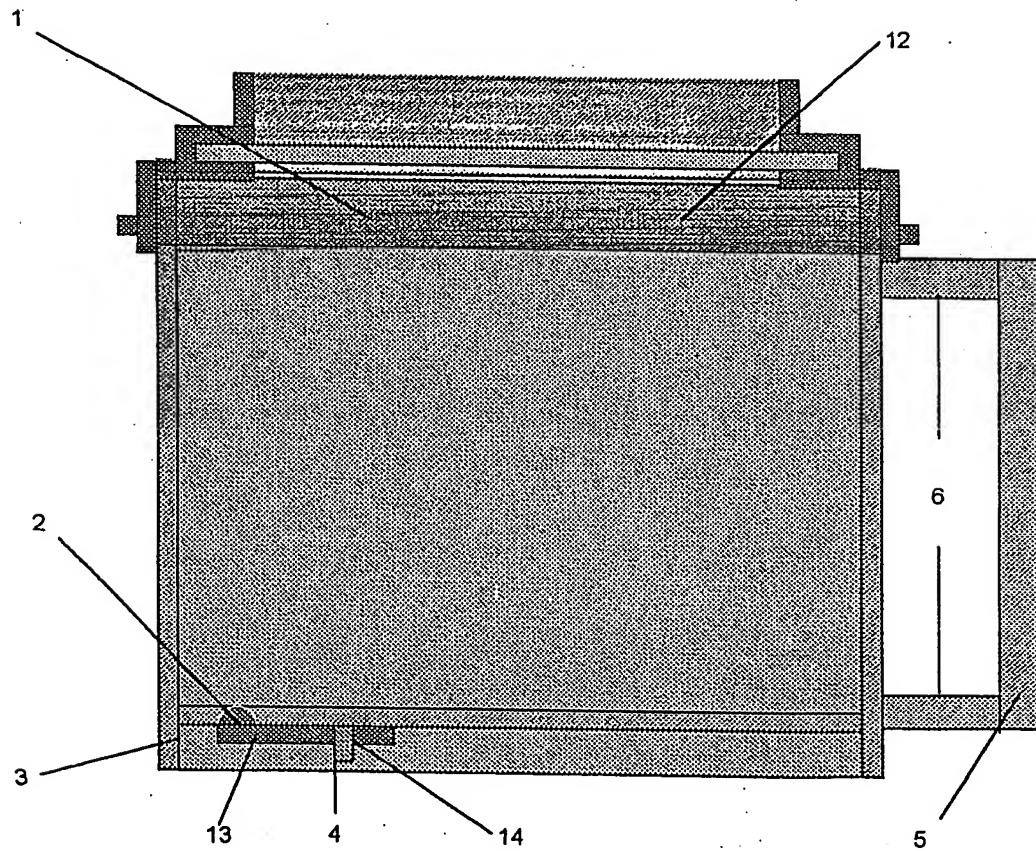
FIGURE 3.



FIGURE 3.1.



FIGURE 4





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FIGURE 5

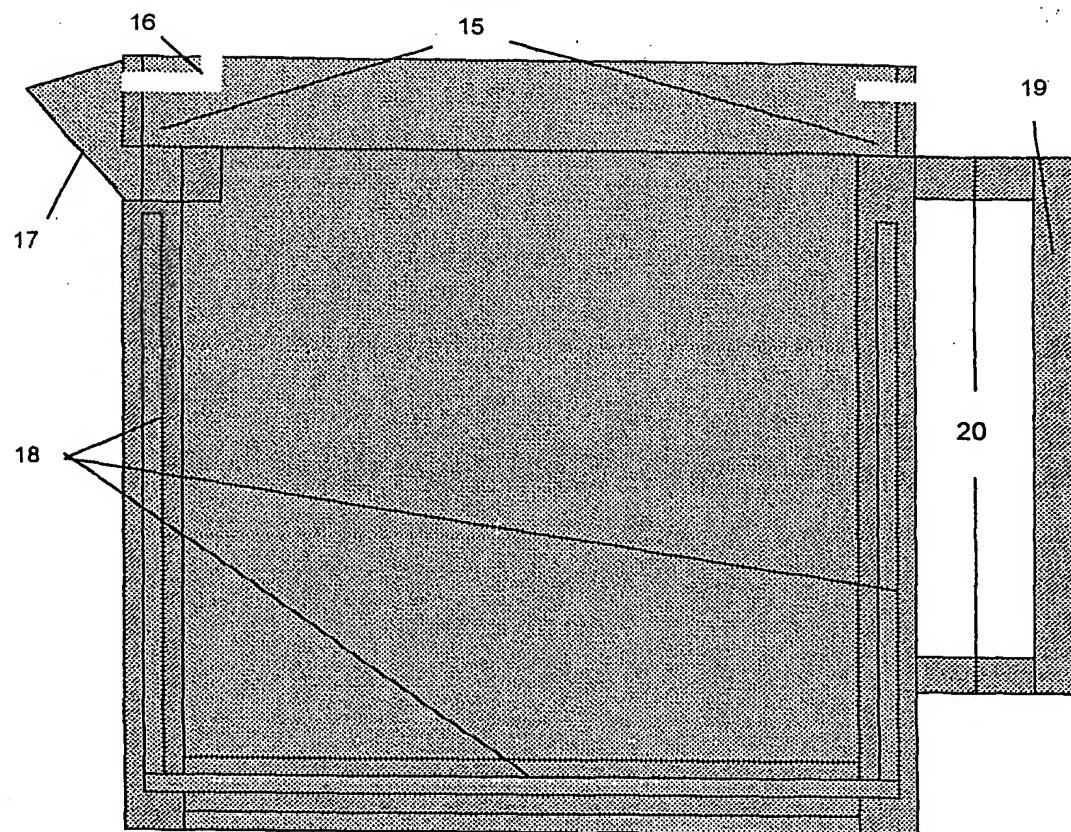
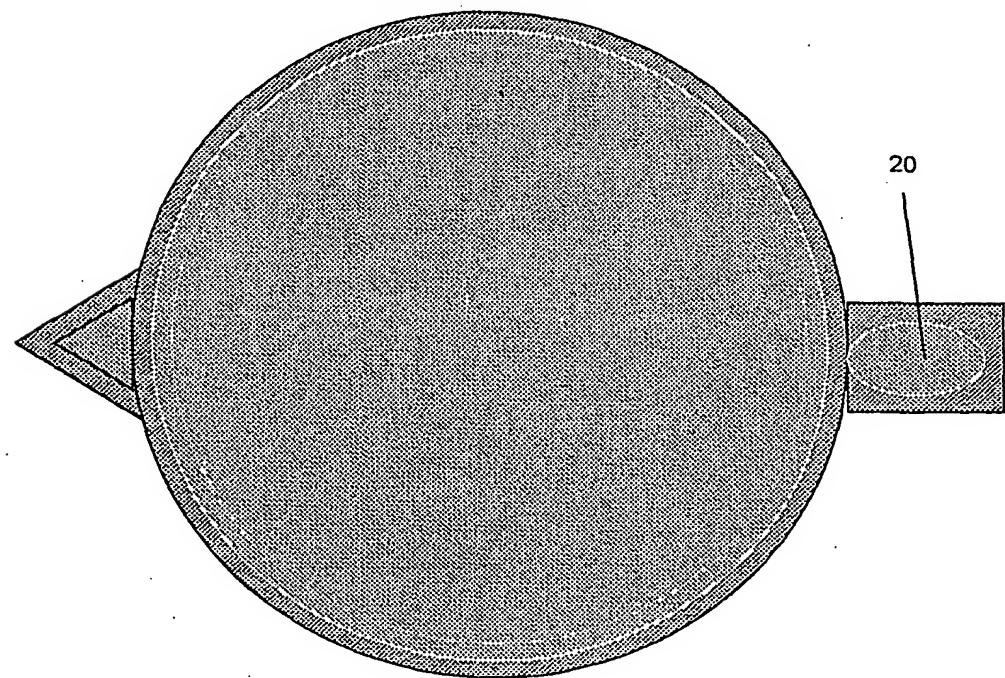


FIGURE 5.1.





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FIGURE 6

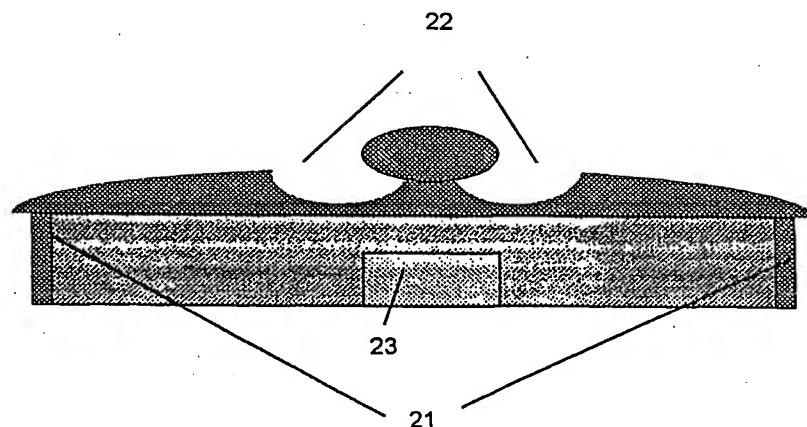
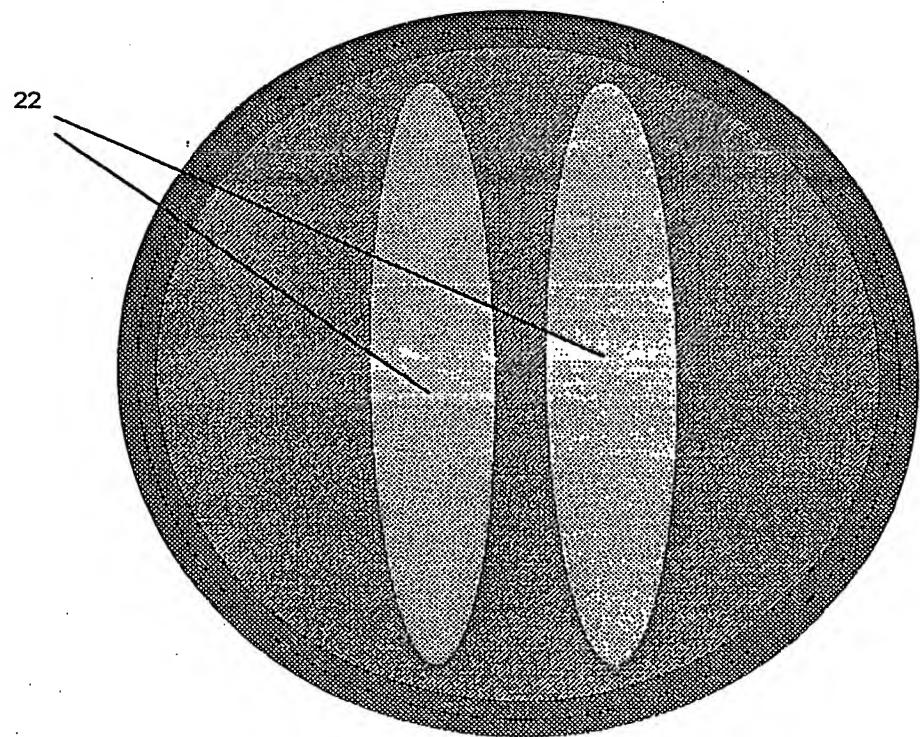


FIGURE 6.1.



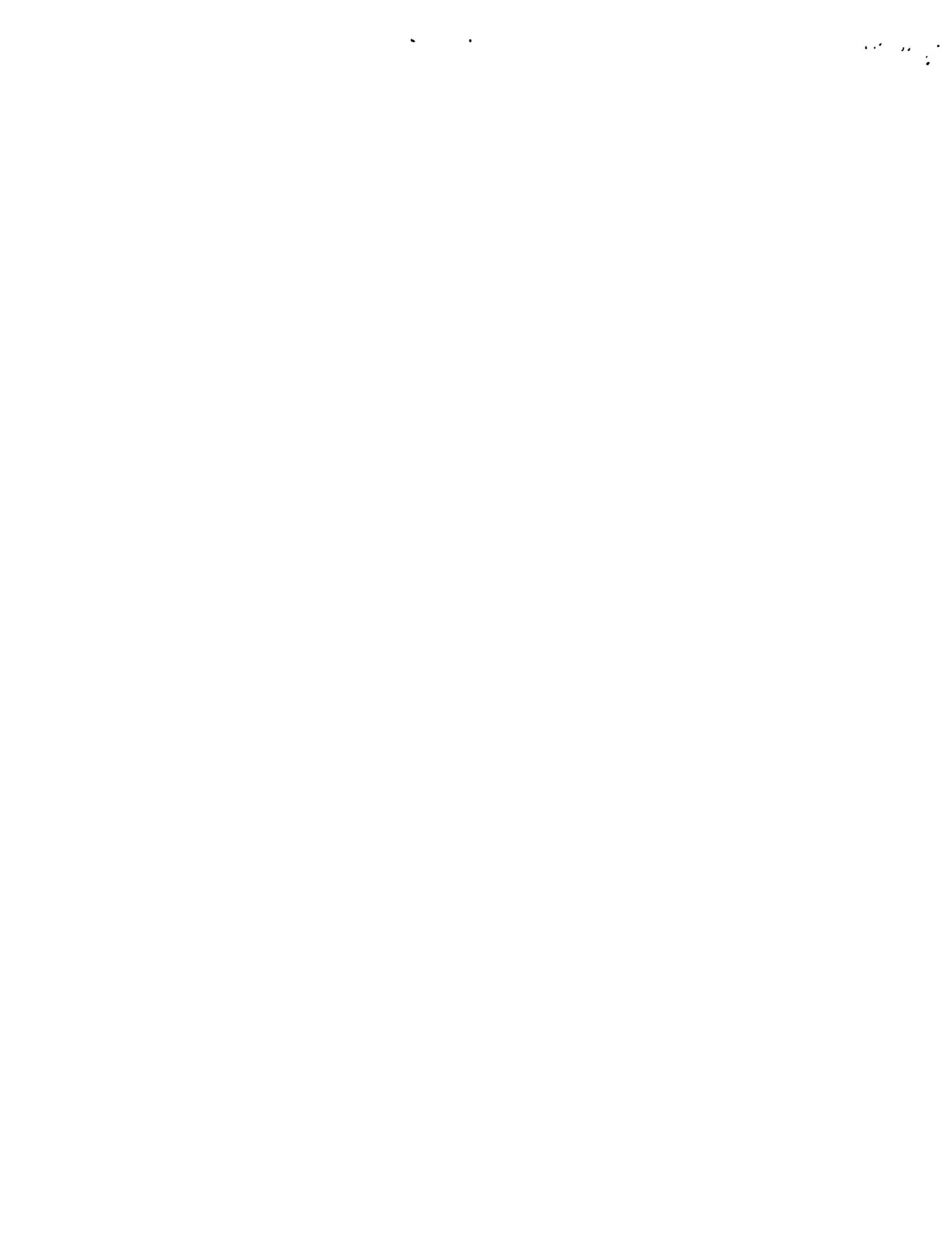
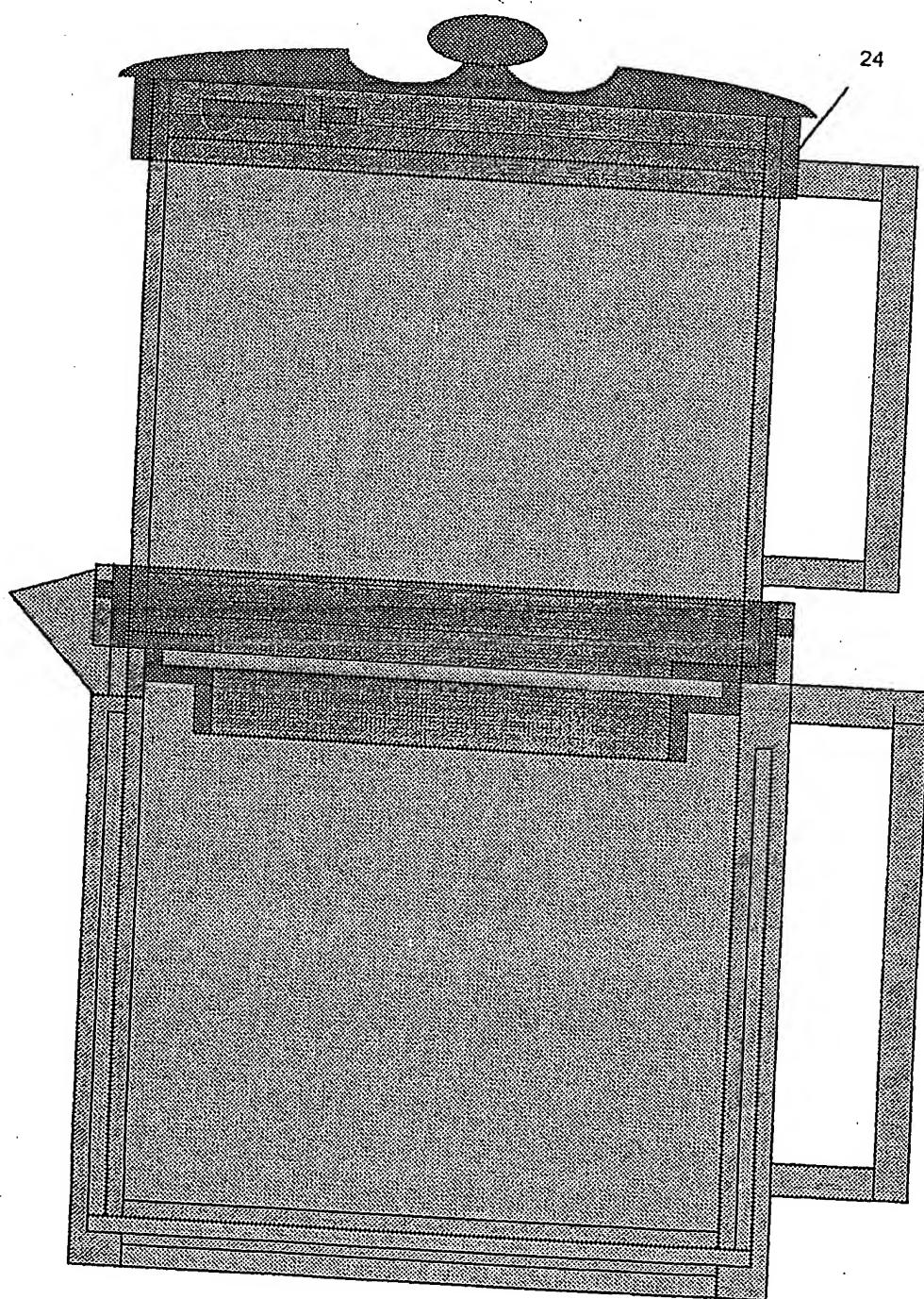


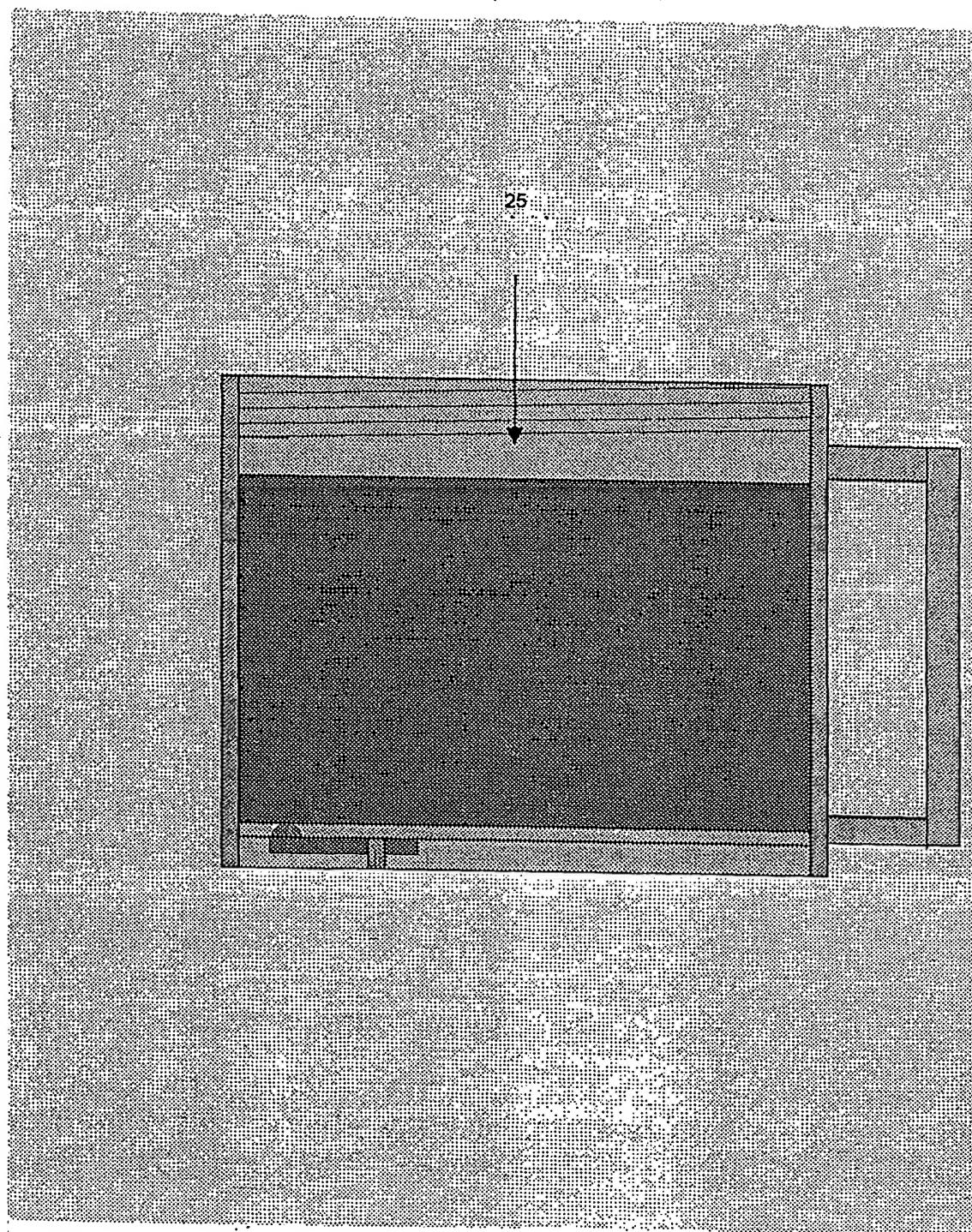
FIGURE 7





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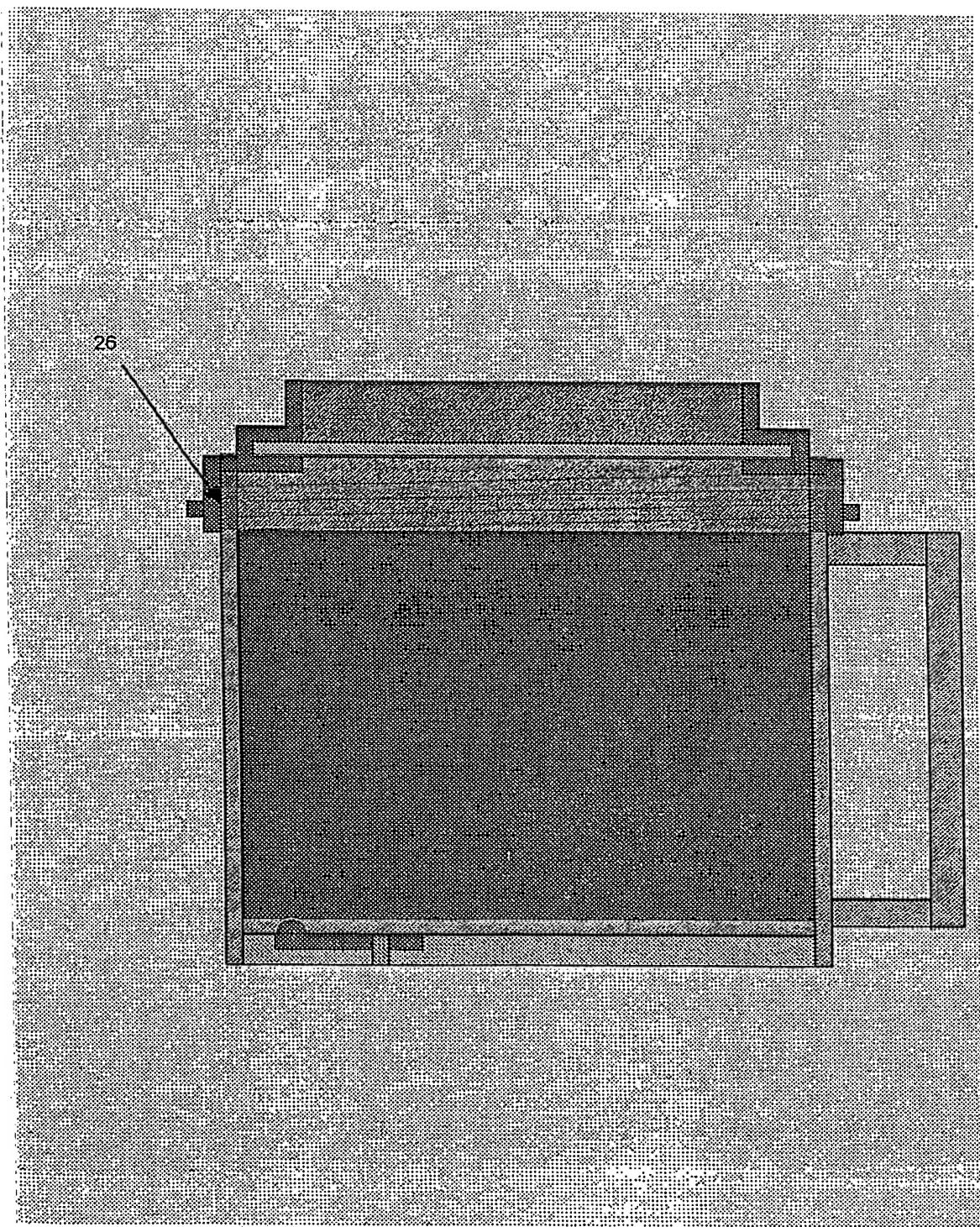
FIGURE 8





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FIGURE 9





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FIGURE 10

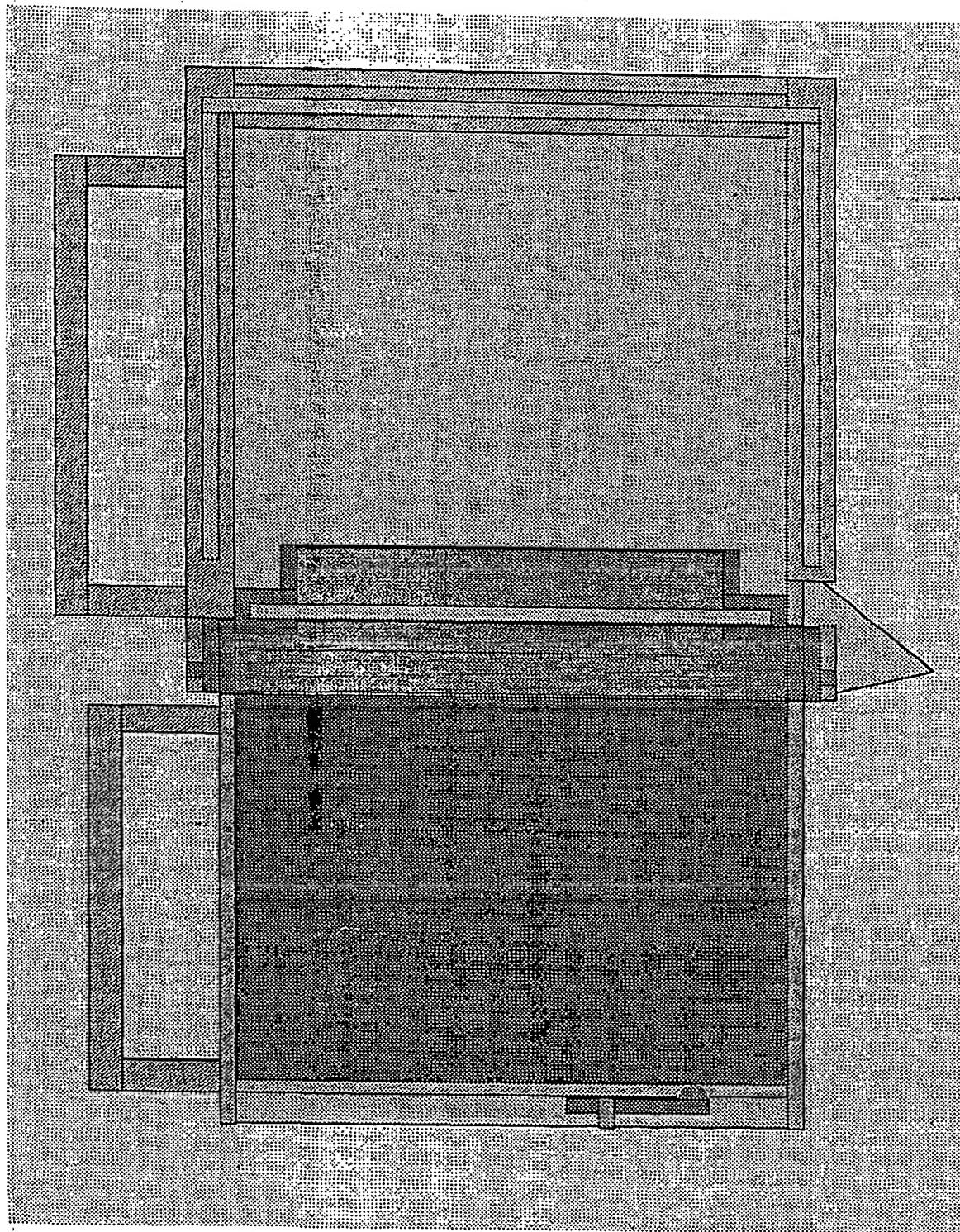
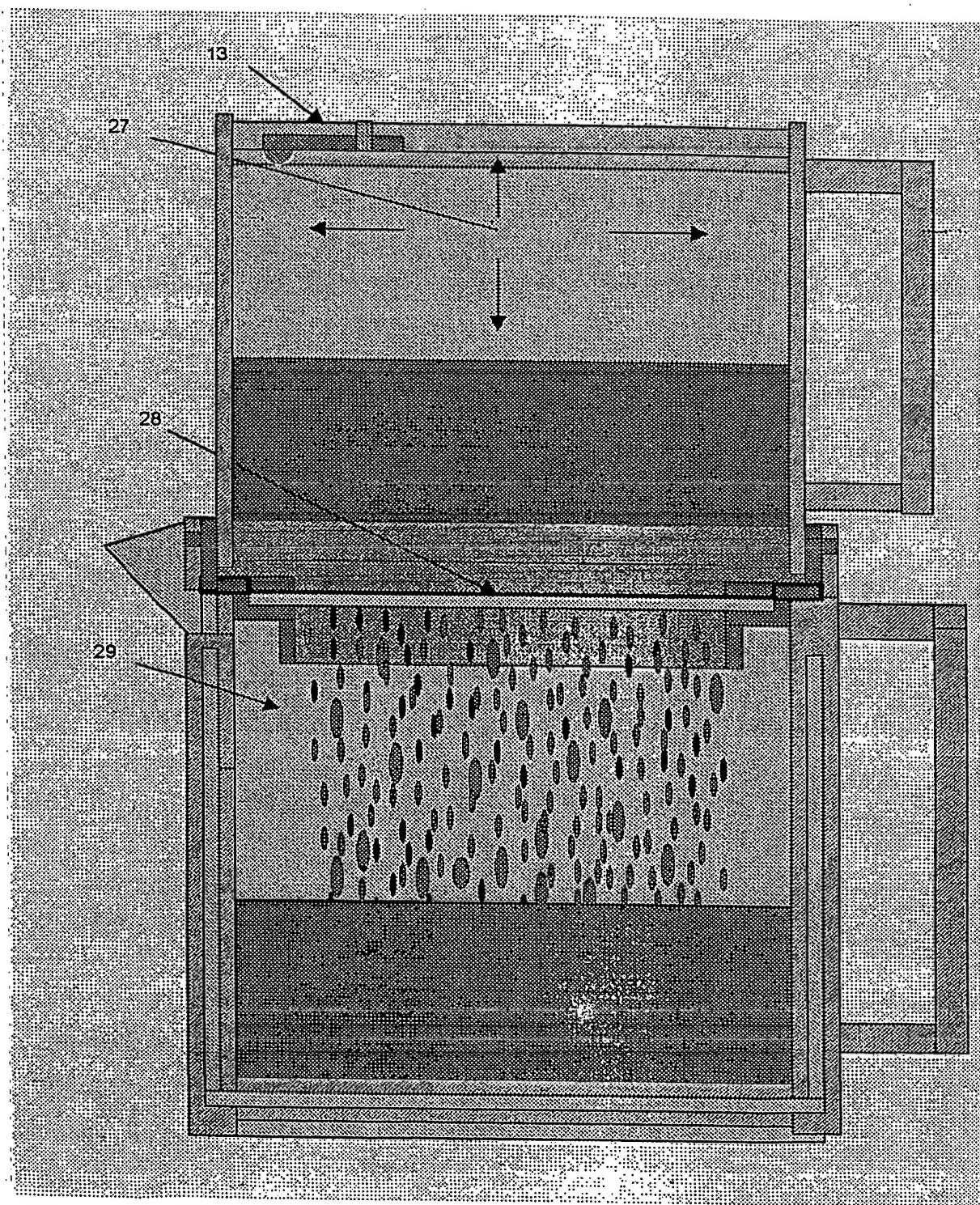




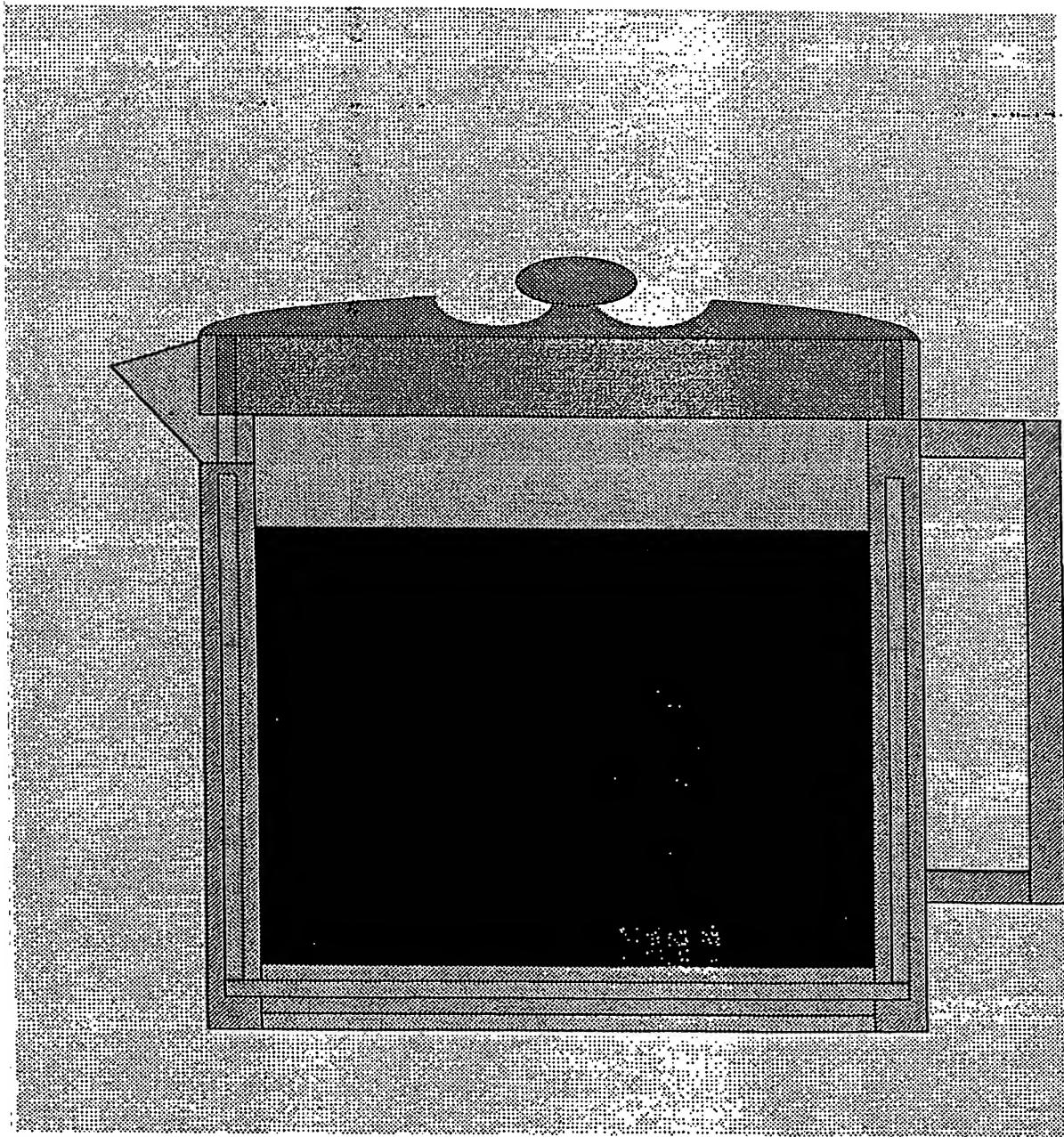
FIGURE 11





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FIGURE 12





INTERNATIONAL SEARCH REPORT

International application No.
PCT/BR 02/00017

CLASSIFICATION OF SUBJECT MATTER

IPC⁷: A47J 31/057

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC⁷: A47J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC, PAJ, DEPATISNET

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5832809 A (M. Gras) 10 November 1998 (10.11.98) <i>the whole document.</i>	1-6
X	US 4908222 A (D. Yu) 13 March 1990 (13.03.90) <i>claims; fig. 1.</i>	1-6
X	US 4386109 A (R.F. Bowen et al.) 31 May 1983 (31.05.83) <i>figs. 1-3; claims.</i>	1-6
X	US 4990734 A (P. Hirsch) 5 February 1991 (05.02.91) <i>the whole document.</i>	1-6
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A	US 5281785 A (M. H. Pasbrig) 25 January 1994 (25.01.94) <i>figs. 1-3; claim 1.</i>	1-6

Further documents are listed in the continuation of Box C.

See patent family annex.

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Date of the actual completion of the international search

17 April 2002 (17.04.2002)

Date of mailing of the international search report

28 May 2002 (28.05.2002)

Name and mailing address of the ISA/AT

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/BR 02/00017

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 4381696 A (J.R. Koral) 3 May 1983 (03.05.83) <i>abstract, figs. 1,5.</i>	1-6
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/BR 02/00017-0

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